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SERIE: PLANKTON · BIND I

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Nr. 3. Ove Paulsen: ON SOME PERIDINEÆ AND PLANKTON-DIATOMS

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KØBENHAVN
I KOMMISSION HOS C. A. REITZEL
BIANCO LUNOS BOGTRYKKERI
1905

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# ON SOME PERIDINEÆ AND PLANKTON-DIATOMS

BY

OVE PAULSEN

KØBENHAVN
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During the voyage of the "Thor" to the Færöes and to Iceland in the summer 1904 I noticed among the many samples of Plankton examined several forms, which are new or insufficiently known. After having reexamined them at home, I here offer information about some of them. It is an advantage to have names for the organisms one meets with, and besides it is the first condition for enabling others to contribute to a better knowledge of these species.

**Peridinium (Euperidinium) Thorianum** n. sp. (fig. 1). Proximal limb almost hemisperical, distal limb a short blunt cone, girdle a distinctly ascending spiral (to the left). Antapical view nearly circular, with a feeble curve in the place of the longitudinal furrow. The distal limb has seven middle plates and seven bottom plates; the proximal limb: five middle plates and two bottom plates. Both limbs are covered with a multitude of small semilunate papillæ. Sometimes a few very short and delicate spines are seen at the bottom of the longitudinal furrow. Longest diameter of the girdle: 56—70 $\mu$; height about the same; chromatophores pale yellow. — This organism is easily discerned by its colour, the absence of spines (the above-mentioned small spines are almost invisible) and the very conspicuous papillæ. It is closely akin to *Peridinium subinermis* Pauls. (l. c. page 24), from which it distinguishes itself by the ascending girdle and by the papillæ. It was found in largest quantity in May, N. & E. of the Færöes (62°36′ Lat. N., 6°20′ Long. W. and 62°05′ Lat. N., 4°30′ Long. W.), in July S. of Iceland (63°29′ Lat. N., 20°24′ Long. W.) and E. of Iceland (66°15′ Lat. N., 12°13′ Long. W), but in 1904 also appeared in many other places round the Færöes and Iceland, most frequently near the coast. It is named after the "Thor", the sea-investigations steamer of the Danish State.

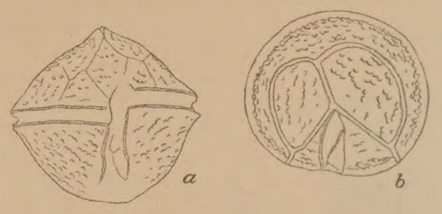

Fig. 1. *Peridinium Thorianum* n. sp. ($^{460}/_{1}$)

**Peridinium (Euperidinium) conicoides** n. sp. (fig. 2). Frontal view of the cell nearly rhombic, antapical view almost circular, with a curve at the place of the longitudinal furrow. Girdle twisting to the left. Longitudinal furrow broad; close to the place where its left margin meets the margin of the girdle it forms a broad curve. In some specimens I have noticed in this place two small spines (fig. 2, *d*, *e*), but as a rule the two margins merge into one another without visible interruption (fig. 2, *a*). At the lower end of the longitudinal furrow, but at a short distance from it, two solid spines proceed from the tops of protuberances of the cell (fig. 2, *a*, *b*, *d*, *e*). The arrangement of the plates is seen in fig. 2, *b*, *c*. Height of the cell (including spines) 48—60 $\mu$. Chromatophores pale yellow.

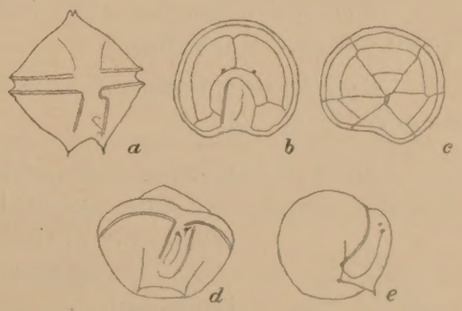

Fig. 2. *Peridinium conicoides* n. sp. From W.-Iceland. ($^{460}/_{1}$)

This species resembles *P. conicum* Gran; the latter, however, is larger (72—76 $\mu$ high; specimens from the Færöes) and is generally red. Moreover, *P. conicoides* is easily discernible by the curve at the margin of its longitudinal furrow.

It appears not seldom, but sporadically, round Iceland and the Færöes, frequently in the fjords and near the coast.

**Peridinium Steinii** Jörgs. (P. Michaëlis auct., non Ehbg.). In Fig. 3, *a—c* and *f* I have given drawings of a series of specimens from a sample, which I took on board the "Thor" W. of Grimsey (63°33′ Lat. N., 18°10′ Long. W.). They are all thick-walled and comparatively short and thick. Their length (including spines) varies from 49—80 $\mu$, and there does not seem to be any considerable lapse in the series of measures, viz.: 80, 79, 72, 72, 64, 64, 58, 56, 52, 52, 52, 49. The two antapical spines are short, sometimes so small that they are not detected at once. One of them is situated at the left margin of the longitudinal furrow, and bears a wing which stretches along the furrow. In a few cases this wing is free, not attached to the spine (fig. *f*). Here we have a transition to the group of *Peridinium pellucidum* and *pallidum*, in which a particular spine at the left margin of the longitudinal furrow supports the perpendicular wing.

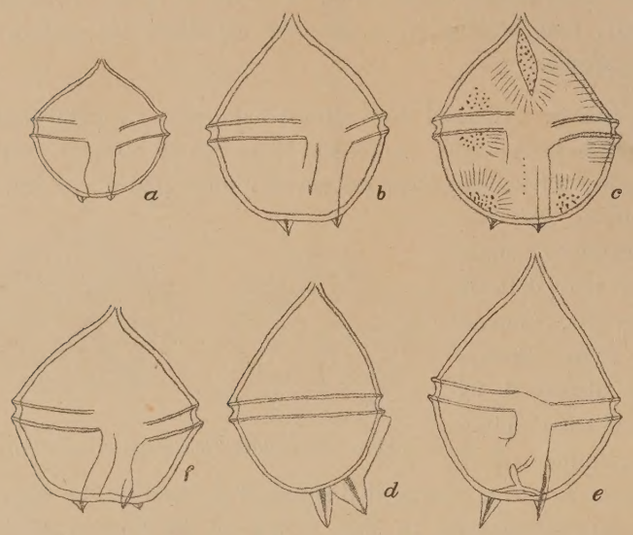


Fig. 3. *Peridinium Steinii* Jörgs.
*a—c*, *f*: from N.-Iceland, *d*, *e*: from the Faeroe-Shetland Channel.

A series of forms similar to the above-mentioned I found in August 1904 at 63°03′ Lat. N., 9°28′ Long. W., in Atlantic water. In these specimens the spines were a little longer, but the cell of the same short and thick shape. Length 44—66 $\mu$.

Fig. 3, *d*, *e* is from a sample taken in the Færöe-Shetland Channel (60°27′ Lat. N., 40°25′ Long. W.) in August 1900 by the S|S "Laura". This form approaches the *„Peridinium Michaelis"* figured by Stein (T. IX. fig. 10). The shape is more slender, the spines large. The perpendicular wing is seen very distinctly attached to the left spine.

These two forms are hardly differing in species. The latter seems to originate in warm water, and to proceed from the south, the former to be a boreal form. I propose to name them as follows:

f. *brevis* n. f. (fig. 3, *a—c*, *f*). Short and broad, with short spines. Length not much exceeding the longest diameter of the girdle.

f. *pyriformis* n. f. (fig. 3, *d—e*). Slender, with long spines. Length exceeding the longest diameter of the girdle by ab. 1/4.

Fig. 3, *c* is remarkable by exhibiting groups of very fine spines surrounded by a regular design of stripes. Besides such spine-covered specimens we find feebly reticulated forms, both of which however appear only as single specimens among the smooth forms.

Fig. 4. *Peridinium conicum?* From the Faeroes (160/1).

Similar specimens with armed membranes also appear among other species of *Peridinium*.

Thus I have seen *Peridinium conicum* covered with small parallel projecting bands carrying small spines, and *P. ovatum* covered all over with small spines. Dr. Gran in Bergen has verbally expressed as his opinion that they are specimens which have become old and have had time to grow. Fig. 4 represents one more of such forms, taken in Skaalefjord in the Færöes by Dr. Schmidt; — similar ones have also been found in the North Sea. It can hardly be considered as an independent form

for it has always been found singly or in very few individuals. It reminds us of *Peridinium conicum*, but lacks the large cellular processes at the bottom. Its valves are composed of the usual plates. Other forms which cannot be determined as yet, are thick-walled and dark.

It is desirable that planktologs should have their attention directed towards such forms, — they may be of importance to the species to which they belong.

**Peridinium faeroënse** n. sp. (fig. 5). Distal limb conical, proximal limb hemisperical. Girdle twisting to the left; plates very thin; their arrangement is seen in fig. *b*, *c*; rhomb-plate easily falling out, very narrow at the top. In the middle of the ventral side a pore (fig. *a*) is seen. Height 32—36 $\mu$. Contents of the cell dark brown.

This small organism has been found in considerably quantity in Trangisvaag Fjord in Suderö (Færöes) on May 19th. Temperature of the water 7°·12 C.

Fig. 5. *Peridinium faeroënse* n. sp. From the Faeroes. ($^{160}/_{1}$)

**Chaetoceras gracile** Schütt. Ber. d. deutsch. bot. Ges. 1895 p. 42, tab. V fig. 13, Syn.: *Ch. septentrionale* Østr. Medd. om Grønland 18. 1895. p. 457, tab. VII. fig. 88. These two species have been united by Cleve (Phytopl. o. t. Atlantic p. 22) and Gran (Die Diat. d. arkt. Meeres p. 542). Lemmermann has again separated them (Das Pl. schwedischer Gewässer p. 137), which I do not consider to be right, at all events not for the present.

The original figures of Schütt of this species are not perfect, and they do not fully correspond with the text (for instance concerning the endocysts). Østrup's figures have the defect of being drawn from ignited material. Nor is a later figure by Cleve (Diat. Baffin's Bay and Davis Strait p. 9 fig. 8) good. — Schütt's material unfortunately has not been accessible to me, but in Østrup's material from East-Greenland (Plankton-sample 13, 75° Lat. N., 11° Long. W., July 13th 1892) the form described as *Chaetoceras septentrionale* is found in great quantity. Fig. 6, *a*—*d*, gives an idea of its appearance. Width of the cell 4—7 $\mu$, Østrup has 8 $\mu$. The corners are contracted, contrary to the statement of Lemmermann, but like Schütt's figure of *Ch. gracile*. In the different specimens we find the setae leading in every possible direction; in some of them they even cross one another, and they curve in many way. This peculiarity can hardly be considered normal; it is probably due to the fact stated in the diary, that this sample consists of big lumps found floating in the surface of the water among ice; and such lumps are supposed to have been frozen in the ice. This seems to be a sufficient explanation of the irregular direction of the setae.

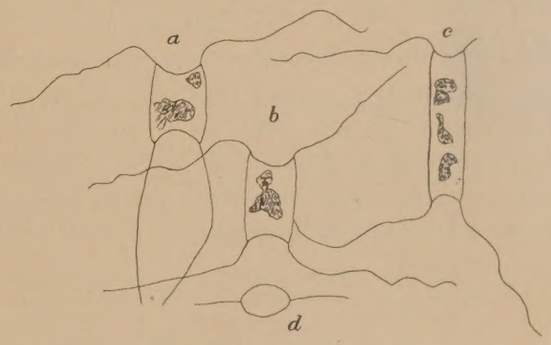


Fig. 6. *Chaetoceras gracile* Schütt. From E.-Greenland. ($^{1000}/_{1}$)

It is no doubt the same species which Cleve describes and figures in 1896 under the name of *Ch. septentrionale*, but it is hardly its typical form, for the corners are drawn in sharp lines, not contracted. In a sample from Baffins Bay (Aug. 15th, 1894), upon which Cleve has based his description and figures, and which is lent me by Mr. Ostenfeld, appears the typical form with contracted corners, together with small forms which remind us of Cleve's figure. This figure has the important feature of being represented with endocysts, which would agree very well with Schütt's figure if this was drawn according to the description („Dauersporen: kugelförmig bis kurz cylindrisch, Boden- und Deckelfläche fast halbkugelig gewölbt, beide rauh bis kurz bedornt").

According to SCHÜTT's drawing the endocysts are spiny only at one end, whereas those of CLEVE are papillous at both ends.

Fig. 7 (from the North Coast of Iceland, at Gjögur, Aug. 1903) represents a *Chaetoceras gracile*, which is not rare, especially at the North- and West Coast of Iceland. Breadth of the cell 8—11 $\mu$. It differs from SCHÜTT's figure by feeble contractions at the sutures and by the direction of the setae. I consider it as a geographical race of *Ch. gracile* and suggest that it should be named: f. *septentrionale* (Østr.). It is, I think, identical with the form figured by ØSTRUP and with my fig. 6.

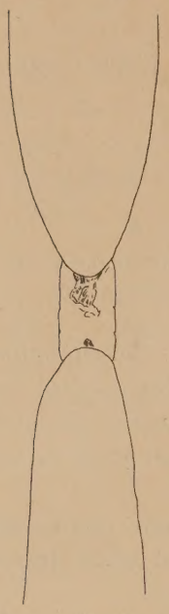

Fig. 7. *Chaetoceras gracile* Schütt. From N.-Iceland. ($^{1000}/_{1}$)

**Chaetoceras simplex** Ostf. Vidensk. Meddel. fra d. naturhist. Forening i København 1901, p. 137 fig. 8.

That a species known from the Caspian Sea is found near Iceland sounds strange, but is not without parallel, for OSTENFELD reports (l. c. p. 136) the Baltic *Chaetoceras radians* Schütt from the Caspian Sea.

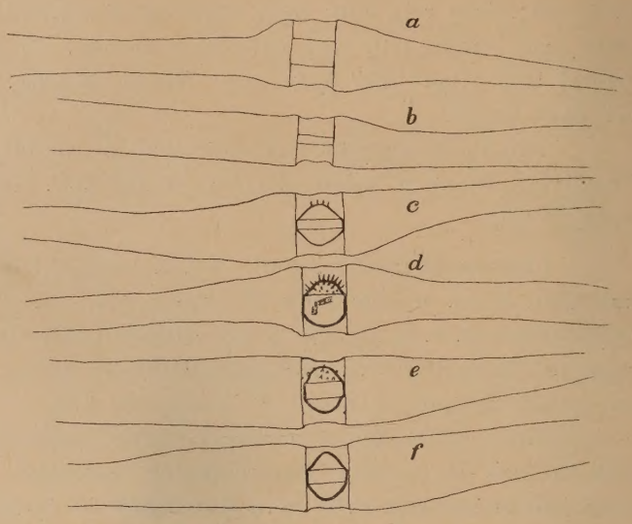


Fig. 8. *Chaetoceras simplex* Ostf. From Oefiord. ($^{460}/_{1}$)

The Icelandic form is represented in fig. 8, *a—f*. Breadth of the cell 7—10 $\mu$. As a rule it is single; sometimes two individuals are linked together. Its setae lie in the sagittal plane and turn off perpendiculary to the long axis of the cell. The valves are concave with a slight convex curve in the centre; the sutures frequently appear distinct. It has two chromatophores, one on each valve. The endocysts are either without spines or provided with shorter or longer papillæ or spines. The most frequent occurrence seems to be a tolerably small number of papillæ or short spines (fig. 8 *c*, *e*).

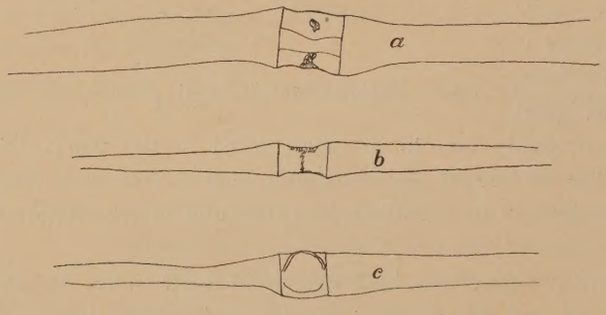


Fig. 9. *Chaetoceras simplex* Ostf. From the Caspian Sea. ($^{460}/_{1}$)

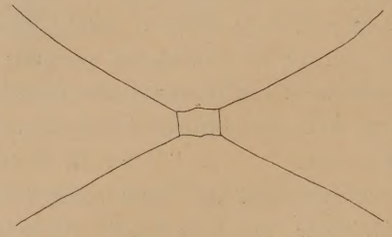

Fig. 10. *Chaetoceras simplex* Ostf. var. *calcitrans* n. var. From N.-Iceland. ($^{460}/_{1}$)

For comparison we reproduce (fig. 9) three cells of the original sample from the Caspian Sea (Krasnowodsk). Breadth 8—10 $\mu$; in one of them (*c*) there is a beginning formation of spores. — GRUNOW (in „Algen und Diat. a. d. kasp. Meere", tab. IV, fig. 24) has figured a *"Goniothecium barbatum"* a Chætoceras-spore, which may quite well be a strongly arched spore of *Chaetoceras simplex*. OSTENFELD

considers it as belonging to *Ch. radians*, but being only spiniform at one end, it more resembles *Ch. simplex*.

*Chaetoceras simplex* occurs frequently in late summer at the north and east of Iceland. Thus it was found in immense quantity by the "Thor" in Oefjord, in August 1904.

*Chaetoceras subsalsum* Lemmermann (l. c. p. 137, 141, tab. I, fig. 16), judging from its description and figure is closely akin to *Chaetoceras simplex*. It was found in a lake of brackish water in Upland [Sweden], and possibly represents a geographical race of *Ch. simplex*. The principal difference is only that it possesses one chromatophore and lyrately curved setae.

Another closely-related form is

*Chaetoceras simplex* var. *calcitrans* n. var. It differs from the main species by the direction of the setae (see Fig. 10). Breadth 5—16 $\mu$. Chromatophores and endocysts unknown. It may occur together with *Chaetoceras simplex*. It is not rare around Iceland, but seems to occur sporadically. In some features (e. g. the direction of the setae) it reminds us of *Ch. Mülleri* Lemmermann (Forschungsber. Plön, VI, 2, 1898, p. 192), nevertheless it seems to differ from it, for one thing by the shape of the valves.

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